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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/840,088	05/06/2004	Damien Bonaventure	CA920030011US1	7850
25259	7590	01/09/2008	EXAMINER	
IBM CORPORATION 3039 CORNWALLIS RD. DEPT. T81 / B503, PO BOX 12195 REASEARCH TRIANGLE PARK, NC 27709			TECKLU, ISAAC TUKU	
			ART UNIT	PAPER NUMBER
			2192	
			NOTIFICATION DATE	DELIVERY MODE
			01/09/2008	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

RSWIPLAW@us.ibm.com

**Office Action Summary**

Application No.

10/840,088

Applicant(s)

BONAVENTURE ET AL.

Examiner

Isaac T. Tecklu

Art Unit

2192

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 October 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. This action is responsive to the amendment filed on 10/22/2007.
2. Claims 1 and 11 have been amended.
3. Claims 1-17 have been reexamined.

### *Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-8 and 11-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Metzger et al. (US 6,341,370 B1), hereinafter Metzger.

As per claim 1 (Currently Amended), Metzger discloses a method of determining an execution order for machine instructions to reduce spill code (e.g. FIG. 6, steps 701-705 and related text), said method comprising the step of:

from machine instructions that are ready for scheduling(e.g. FIG. 4, SCHEDULE INSTRUCTION 409 and related text), scheduling the machine instruction for which an amount by which a size of a committed set of machine instructions would increase upon the scheduling of said machine instruction is smallest (col. 4:10-20 "... resolve register conflict .. determining a register that may be spilled at the least cost..."and e.g. FIG. 2, UNSCHEDULED and SCHEDULED INSTRUCTION and related text) ; and

determining an execution order for the machine instructions to reduce spill code (col. 2: 50-60 "... Scheduler 307 of FIG. 3 may be utilized to map selected operations to appropriate function ... the order of execution minimizes execution time ...").

As per claim 2, Metzger discloses the method of claim 1, wherein said committed set of machine instructions includes any machine instruction that is already scheduled (col. 3:1-20 "... currently committed, then a conflict may need to be resolved ...") and any machine instruction that is descendent from an already scheduled machine instruction (e.g. FIG. 5, step 515 and related text).

As per claim 3, Metzger discloses the method of claim 2, wherein, for each of said machine instructions ready for scheduling, said amount is determined by:

identifying descendent machine instructions of each of said machine instructions (e.g. FIG. 4, step 405 and FIG. 2, and related text); and determining which of said descendent machine instructions and said machine instructions is not in said committed set of machine

instructions (col. 4: 60-65 "... instructions to utilize ... not currently committed ..." e.g. FIG. 4, 417 and related text).

As per claim 4, Metzger discloses the method of claim 1, wherein said committed set of machine instructions includes any machine instruction that is descendent from an already scheduled machine instruction (col.4: 60-67 "... scheduler strategy may be ... resolve a scheduling issue...").

As per claim 5, Metzger discloses the method of claim 4, wherein, for said each machine instruction ready for scheduling, said amount is determined by:

identifying descendent machine instructions of each of said machine instructions (e.g. FIG. 4, step 405 and FIG. 2, and related text); and determining which of said descendent machine instructions is not in said committed set of machine instructions (col. 4: 60-65 "... instructions to utilize ... not currently committed ..." e.g. FIG. 4, 417 and related text).

As per claim 6, Metzger discloses the method of claim 1, wherein a given machine instruction is considered ready for scheduling when scheduling of said given machine instruction as a next machine instruction would not cause an erroneous programmatic result (col. 3:1-20 "... currently committed, then a conflict may need to be resolved ...").

As per claim 7, Metzger discloses the method of claim 1, wherein said method is undertaken when a risk of register over committedness exceeds a certain threshold (col. 4:10-20 “... resolve register conflict .. determining a register that may be spilled at the least cost...”and e.g. FIG. 2, UNSCHEDULED and SCHEDULED INSTRUCTION and related text).

As per claim 8, Metzger discloses the method of claim 7, wherein said threshold is exceeded when processor register availability drops below a particular threshold (col.6:20-35 “... register spill to a threshold ...”).

As per claim 11, this is the computer program product version of the claimed method discussed above (Claim 1), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Metzgera.

As per claim 12, this is the computer program product version of the claimed method discussed above (Claim 2), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Metzgera.

As per claim 13, this is the computer program product version of the claimed method discussed above (Claim 3), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Metzgera.

As per claim 14, this is the computer program product version of the claimed method discussed above (Claim 4), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Metzgera.

As per claim 15, this is the computer program product version of the claimed method discussed above (Claim 5), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Metzgera.

6. Claims 9-10 and 16-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Widell et al. (US 6, 625,807 B1).

As per claim 9, Widell discloses a method of determining an execution order for machine instructions to reduce spill code (paragraph [0030] "... executed ... in the program order ..." and e.g. FIG. 3B and related text), said method comprising the steps of:

in a first bit vector containing one bit to represent each machine instruction to be scheduled, setting those bits for which the represented machine instruction is not committed, and resetting the remaining bits (paragraph [0034] "... divide into a load vector 9a, 10a, 11a of FIG. 1..." and paragraph [0039] "... threads for which ... committed ...");

for said each machine instruction to be scheduled that is ready for scheduling (e.g. Fig. 3A and related text):

in a second bit vector also having one bit to represent each machine instruction to be ordered in the same sequence as in said first bit vector, setting those bits for which the

represented machine instruction is a descendant of said each machine instruction that is ready for scheduling, and resetting the remaining bits (paragraph [0034] "... divide into a load vector 9a, 10a, 11a of FIG. 1..." and paragraph [0039] "... threads for which ... committed ...");

performing a bitwise AND operation of said first bit vector and said second bit vector to create a third bit vector (paragraph [0051] "... logical operations bitwise ... vector AND..."); and

determining the number of set bits in said third bit vector (paragraph [0036] "... read operations ... bit position number ..."); and

selecting for execution the machine instruction for which said third bit vector contains a minimum number of set bits (paragraph [0064] "... a few bit in the data structure ..." and e.g. FIG. 2B and related text).

As per claim 10, Widell discloses the method of claim 9, said method further comprising the step of, prior to performing said bitwise AND operation, setting in said second bit vector the bit for which the represented machine instruction is said each machine instruction that is ready for scheduling (paragraph [0051] "... logical operations bitwise ... vector AND...").

As per claim 16, Widell is the system version of the claimed method discussed above (Claim 9), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Widell.

Art Unit: 2192

As per claim 17, Widell is the computer program product version of the claimed method discussed above (Claim 10), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Widell.

### *Response to Arguments*

7. Applicant's arguments with respect to claims 1-17 have been considered but are moot in view of the new ground(s) of rejection. See Metzger and Widell, art made of record.

### *Conclusion*

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Isaac T. Tecklu whose telephone number is (571) 272-7957. The examiner can normally be reached on M-TH 9:300A - 8:00P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2192

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



**TUAN DAM**  
**SUPERVISORY PATENT EXAMINER**

Isaac Tecklu

Art Unit 2192